PB .

RESTRICTED CIRCULATION

This paper is not an official document; it is for information only and must not be quoted in any printed publication.

# AGRICULTURAL MEMORANDUM No 626 - MAIZE IN THE NORTH II

by J B Tyldesley

## 1. Information from Bishop Burton

Maize was grown in 1971, 1972 and 1973 at the Bishop Burton College of Agriculture. The college is near Beverley at about 150 ft above sea level, and the soil is a fertile loam over chalk. The growing of the crop and the collection of meteorological and agronomic data was under the control of Mr M D Alder, lecturer at the College, who has kindly made available the information on which this note is based.

Sowing and harvesting dates varied slightly, but were near to the beginning of May and the end of October respectively in each year. Table 1 summarises some aspects of the results.

Table 1 Maize at Bishop Burton

| Year | acc °C days above 10°C May-Oct | Yield of dry matter | |
|---|---|---|---|
| | | tonne/ hectacre | ton/ acre |
| Average 1941-70 (Leconfield) | 788 | - | - |
| 1971 | 631 | 12.25 | 4.9 |
| 1972 | 422 | 6.4 | 2.6 |
| 1973 | 612 | 13.2 | 5.2 |

In judging the success or failure of maize as a forage crop, we may take as yardstick the 3 tons of dry matter per acre which can be produced from well-managed grassland. By this standard, 1971 and 1973 were successful years, and 1972 came just within the category of "poor crop" of Ag Mem 591. The yields in 1971 and 1973 suggest that the lower limit for a "good"crop could be set below 600 acc °C days. This is embodied in the scheme of table 2, which may well need to be changed again as further information becomes available.

Table 2 Revised scheme for response of maize to temperature in Northern England

| Accumulated °C days May-Oct | Response |
|---|---|
| Less than 400 | Crop fails |
| 400-450 | Poor crop |
| 450-550 | Tolerable crop |
| 550-700 | Good crop |
| more than 700 | Grain harvest possible |

## 2. Calculation of accumulated temperatures - a correction

In Ag Mem 591, p1, last paragraph 3rd sentence, there is an error. It should read:

> "Although the mean is still 15°C, the contribution to the degree-days is now more than 5, by an amount depending on the hour-by-hour temperature variation".

Notes in Ag. memo. 591 VC/5/74

I am grateful to Dr E S Bunting for pointing this out. In the example quoted, more acc °C days are gained by the higher maximum, than are lost by the lower minimum.

The intention was to convey the idea that as the peak of a daily temperature wave rises above the base (10°C in this case) the rate of increase of accumulation is very slow at first, increases as more of the curve rises above the base, and reaches a constant value when all the curve is above the base. This constant value is of course, 1°C day for each °C rise in mean temperature. The following example illustrates this.

Base 10°C
Daily temperature range 4°C
Mean temperature rising from 7°C to 15°C

Results, calculated by the formula of Met O Leaflet No 10 ("Agromet method"), are given in table 3.

Table 3 Example of increase in accumulated temperature with increase in mean temperature.

| Temperatures °C | | | Accumulated °C days | Increase in acc °C days, for 1°C increase in mean temperature |
|---|---|---|---|---|
| max | min | mean | | |
| 9 | 5 | 7 | 0 | 0 |
| 10 | 6 | 8 | 0 | $\frac{1}{4}$ |
| 11 | 7 | 9 | $\frac{1}{4}$ | $\frac{1}{2}$ |
| 12 | 8 | 10 | $\frac{1}{2}$ | $\frac{3}{4}$ |
| 13 | 9 | 11 | $1\frac{1}{4}$ | $\frac{3}{4}$ |
| 14 | 10 | 12 | 2 | 1 |
| 15 | 11 | 13 | 3 | 1 |
| 16 | 12 | 14 | 4 | 1 |
| 17 | 13 | 15 | 5 | etc |

Any comments on this paper should be sent to the author.

Meteorological Office
MAFF
Windsor House
Cornwall Road
Harrogate HG1 2PW

June 1974